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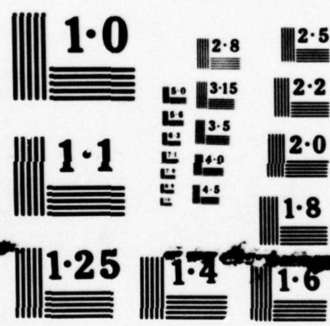
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John S. Cathcart, Robert D. Goddard, and
Stuart A. Youngblood

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The reliability and validity of an instrument designed to measure five core job (task) attributes were examined for three different samples. Results indicate that the *a priori* distinctions among job attribute constructs are appropriate and that two attributes, task autonomy and skill variety, are consistently related to general job satisfaction. Implications for the use of job design instruments are discussed.

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Management Summary

The Job Diagnostic Survey (JDS), an instrument designed to measure job or task perceptions, was administered to student, industrial and military samples. The purpose of this report is to assess whether the JDS yields empirically distinct dimensions regardless of the research setting. While the focus of the present report is more theoretical than earlier reports, several implications for manpower managers are discussed.

Why study job design constructs?

Managers and researchers alike have directed their attention to the job or task as one of the major links between the individual and his/her employing organization. Accordingly, research effort has been directed toward the development of an instrument that yields perceptions of the job in terms of a set of salient charcteristics. The ability to measure individual perceptions of job or task characteristics reliably, provides a means to test whether job characteristics influence the attitudes that people hold toward their work and, in turn, their actual job behavior. As a first step, however, we must be able to measure job characteristics reliably such that valid generalizations about how the job influences attitude and behavior can be made across different settings, people, and time.

What were the major objectives of this report?

The present report's focus is on three issues: a) does the

JDS measure five distinct characteristics of the job, if not. can fewer characteristics be represented, b) do individual perceptions of the job remain stable over time, and c) are certain job characteristics consistently related to the satisfaction that individuals derive from performing the job?

Results?

The JDS was designed to measure five distinct characteristics of the job: skill variety, autonomy, task identity, feedback from the job, and task significance. Three different statistical models were employed to analyze the intercorrelation among the questionnaire items designed to measure the five different characteristics. In two of the samples, the student and industrial, the results supported the theoretical distinction drawn among the five characteristics. The results for the military sample of marine recruits indicated that fewer dimensions were appropriate in describing the tasks performed by recruits. Specifically, the dimension skill variety was moderately correlated with the dimensions of autonomy, task significance, and feedback.

In two of the samples, the industrial and military, the stability of job perceptions over time was examined. The correlations were moderate at best; the implications for measurement are unclear, since it is not clear whether the JDS instrument is unreliable or whether job perceptions are changing over time.

Finally, the validity of the JDS was assessed by determining the relationship between the five job dimensions of the JDS and

general job satisfaction. In each of the three samples the dimensions of skill variety and task autonomy were significantly related to general job satisfaction.

<u>What conclusions and implications can be drawn?</u>

The results of this report provide support for the measurement of perceived job characteristics in terms of a finite set of unique dimensions. Moreover, two of these dimensions, skill variety and autonomy, are consistently related to general job satisfaction. Two implications can be drawn from this report. First, when the JDS is used in different settings (for research or job diagnosis or redesign purposes) we have some confidence that the instrument measures what it purports to measure, namely, the five core job or task characteristics of skill variety, autonomy, task identity, feedback from the job, and task significance. Secondly, the implication for job design or redesign is to create jobs that permit workers to utilize a variety of skills and to exercise autonomy in decisions regarding how the job is to be done, if employee satisfaction with the job is to be maximized.

Future research should be directed toward experimental manipulation of task dimensions to assess the relationship between job characteristics and job satisfaction and job performance. The mechanism for objectively altering jobs such that job incumbents will perceive such changes is not fully understood. Moreover, the role of individual differences in responses to redesigned jobs has not been adequately assessed using

experimental approaches. These are areas for further research that could expand our understanding of the relationships among work characteristics and affective and behavioral responses to the work setting.

Abstract

The present study addresses the issue of whether to treat job design constructs in terms of conceptually distinct, *a priori* constructs or as dimensions determined empirically by analytic data procedures such as principal components or factor analysis. Hackman and Oldham's (1975) Diagnostic Survey (JDS) was administered to three distinct samples; the underlying structure of the instrument was examined both within and across samples using three different factor models. Partial support was found for the *a priori* job attribute distinctions of the JDS. Using the results of each factor model as well as the *a priori* dimensions as independent variables in separate regression models revealed that autonomy and skill variety were the strongest determinants of general job satisfaction (the dependent variable in all regressions) for all three samples. In general, the *a priori* dimensions were equally good predictors of general job satisfaction as the factors extracted from the factor analytic models. Recommendations for the use of job design instruments were made.

Perceived Job Design Constructs:

Reliability, and Validity

Within the past fifteen years considerable attention has been focused on the conceptualization and measurement of job design characteristics (Turner & Lawrence, 1965; Hackman & Lawler, 1971; Brief & Aldag, 1975; Pierce & Dunham, 1976). The identification and measurement of job characteristics have served an important role in the theoretical development of work motivation (Hackman & Oldham, 1974, Note 1), turnover and absenteeism (Porter & Steers, 1973; Youngblood, 1978), job satisfaction (Hackman & Oldham, 1975, 1976; Stone, 1976), and in the applied areas of job redesign strategies (Hackman, Oldham, Janson & Purdy, 1975; Lawler, Hackman & Kaufman, 1973), staffing, job evaluation, and compensation (Dunham, 1977; Schneider, 1976).

The Hackman and Oldham (1975) Job Diagnostic Survey (JDS) is the most widely used instrument for the measurement of perceived job or task design characteristics.[1] Recently, several investigators have examined the JDS to determine whether the five *a priori* dimensions of the JDS (skill variety, autonomy, task identity, feedback and task significance) are empirically distinct (Dunham, 1976: Dunham, Aldag & Brief, 1977; Pierce & Dunham, 1978). While Hackman and Oldham (1974, Note 1) have made a conceptual distinction among the five JDS dimensions, they also have suggested

that the dimensions may not be empirically distinct and advise investigators to recognize and account for these non-independent relationships in subsequent analysis and interpretation of the job dimension scores.

The decision of whether to treat the JDS dimensions as distinct constructs or to rescale them into fewer dimensions depends on both theoretical and empirical considerations. If the researcher is primarily interested in predicting or forecasting, for example, behavioral or affective responses to the job, then the amount of explained variation accounted for by the job design characteristics as a set would be of greater interest than the separate effects of each job design characteristic (Anderson & Shanteau, 1977). When the job characteristics are found to be highly intercorrelated, an appeal to parsimony might further direct one to condense or reduce the dimensions through the use of principal components or factor analysis.

In addition to a predictive strategy one might also be interested in maintaining the a priori distinctions where, on theoretical grounds, the role of individual differences suggests that the independent effects of a priori job dimensions on affective and/or behavioral responses will differ across samples of employees. The samples may be differentiated in terms of organization level, personality, interests, sex, race, culture

and so forth. Although a theoretical distinction can be made among the job design characteristics, these distinctions may disappear in the form of multicollinearity when a regression model is used to estimate the coefficients of each job design dimension, or, equivalently, when an analysis of variance model yields nonsignificant main effects. Again, a factor analytic model could be employed to reduce the job design characteristics to fewer, independent dimensions. If this strategy is pursued, then a factor model that yields orthogonal rather than oblique factors would be preferred to identify the separate constructs among the job design dimensions. When a behavioral or affective measure is regressed on job design dimensions and one is interested in the independent effects of the job dimensions, then this strategy would avoid a multicollinearity problem.[2] There is, however, no guarantee that an orthogonal factor model will yield job dimensions that resemble the *a priori* JDS constructs.

Recently several studies have attempted to address the dimensionality of the JDS (Dunham, 1976; Dunham *et.al*., 1977; Pierce & Dunham, 1978) and have employed a variety of factor models with distinct samples of workers both within and across organizations. Attempts to generalize the findings of these studies are difficult, especially when one study concludes that either a single dimension or a four dimension solution exists (Dunham, 1976) and another study suggests ". . . that users of the JDS define task design scales which

correspond to the structure identified through factor analysis of the sample being utilized." (Dunham, et.al., 1977). Injudicious use of this latter strategy can yield situation specific findings that could be due to arbitrary decisions regarding the type of factor model employed, specific characteristics of the sample, or the generic character of the jobs chosen for the administration of the JDS. An important issue that needs to be addressed is whether job design constructs can be generalized across different research settings.

The present study was designed: a) to examine the similarity (dissimilarity) of three different factor analytic model solutions within each of three distinct samples, and b) to compare each factor analytic model across the three distinct samples. The extent to which similar JDS factors appear across different factor models within samples and similar factors appear across different samples using identical factor models provides an additional test of the validity of the JDS factors as job design constructs.

In addition, repeated measures have been taken with two of the three samples, thus providing a test-retest as well as internal consistency estimate of the reliability of the underlying constructs of the JDS. Finally, the validity of the JDS constructs is explored by examining the relationship between affective responses to the job and factor scores derived from the factor models of the

JDS for each of the three samples.

Method

Subjects

Student Sample. This sample consisted of 80 undergraduates who participated in an experiment to partially fulfill the requirements of an introductory psychology course. A between subjects design was employed that utilized a task which asked students to verify the information on computer cards with a printed listing of that information. Task dimensions of autonomy, variety, significance, identity, and feedback were experimentally manipulated to create variance in perceived task scope (manipulation checks indicated that low or high autonomy, variety, etc., conditions were perceived as intended). In an attempt to simulate an actual work setting, subjects were asked to imagine that the task they performed was as an actual job in a real organization. Two subjects were omitted from the analysis due to missing data. All subjects were between the ages of 18 and 30, 42% were male, 73% were white, and all had a high school degree or higher education.

Industrial Sample. A stratified random sampling plan was used to select 407 nonmanagerial employees from 17 job titles and four different departments of a large midwestern utility. Valid data were obtained for 395 employees. The sample was stratified

with respect to job title and the distribution of job titles over different geographical locations within the city where the utility was located. The sampling plan yielded a sample that was very similar to the population employed by the utility. (For a more complete description of the sampling plan, see Youngblood, 1978.) The sample possessed the following characteristics: 64% male, 78% white, modal age between 26 and 30 years, and 90% had a high school degree or higher education.

Military Sample. United States Marine Corps recruits that entered basic training during August, 1976 at Parris Island, South Carolina comprised the third sample. Data for the present study were obtained from recruits who completed two surveys (each of which contained a short form of the JDS), one at completion of basic training and the second near the end of advanced training. The maximum sample size was 1,040 subjects with some variation in size in subsequent analyses due to missing or inconsistent data. All subjects were males between the ages of 17 and 26, 79.8% were white, and 77.2% had a high school degree or higher education. A detailed description of this sample may be found in Mobley, Hand, and Logan (1977).

Measures

JDS Core Job Dimensions. The JDS was administered to all

three samples to yeild the five core job dimensions of skill variety, task identity, task significance, autonomy, and feedback from the job, each scored as the arithmetic mean of three JDS items. The military sample responded to these 15 items on 5-point Likert scales, while the industrial and student samples used 7-point Likert scales.[3] Table 1 reports the internal consistency reliabilities for each core job dimension across the three samples. The median alpha across the

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Insert Table 1 about here

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the three samples was .67; while these alphas are not high, they are in an acceptable range.

The test-retest reliabilites for the industrial and military samples are disappointingly low. Several influences may account for these results. The industrial sample was engaging in collective bargaining negotiations during the survey and follow-up period, while the military sample was engaged in common basic training, but different advanced training. It is conceivable that the underlying structure of the JDS has not changed even though individual perceptions have. Furthermore, although job design perceptions may change over time, job satisfaction might also change so that the job design-job satisfication relationship is not altered. In other words, changes in job design perceptions may still be related to changes in job satisfaction.

Affective Measures. Three general job satisfaction items from the short form of the JDS were administered to all three samples.

To form an index of satisfaction the three items were averaged for each subject. The coefficient alphas (Cronbach, 1951) for the industrial, military, and student sample, respectively, were .76, .66, and .67. The JDS general satisfaction measure for the military sample was obtained on a 5-point Likert scale; a 7-point scale was used for the student and industrial samples. All general satisfaction scales were standardized prior to subsequent analysis.

Analysis

Factor Analytic Models. Three methods of factorization were used. First, a principal components model was employed for the 15 JDS Items to yield linear compounds of the original items such that each extracted component accounts for successively smaller portions of variance in the standardized item scores and is independent of each of the other components. The second method of factorization employed a principal factor or a common factor model (Nunnally, 1978). The extracted factors are linear compounds of inferred or hypothetical factors rather than observed variables as in principal components. The number of principal factors is assumed to be less than 15, since three JDS items are averaged to obtain each of the five a prior core job dimension scores. The factors are assumed to have zero mean and unit variance and to be mutually uncorrelated. The third method of factorization used maximum likelihood estimation

of factor loadings to maximize the relationship between the sample and population correlation matrix of the JDS items. In addition to the assumptions of the principal factor model, the maximum likelihood model assumes the JDS items are normally distributed and the disturbances are independent of the factors and mutually independent. An attractive feature of the maximum likelihood factor model is the statistical test employed to determine if additional factors are warranted during the extraction process. For each of the three factor models a varimax orthogonal rotation was applied to the initial factor solution.

Regression Analysis. In order to assess the relationship between job scope dimensions and general satisfaction, a series of four multiple regressions were performed for each sample. In the first analysis, satisfaction was regressed on the five *a priori* dimensions. In the next three analyses, satisfaction was regressed on the factor scores produced by each factor model.

Results

Factor Analyses

The optimal number of factors for each sample was determined by the eigenvalues of the unaltered correlation matrix which were greater than one. A factor loading of .40 or greater was used as the criterion for assignment of variables to factors in each of

three sample solutions, and a variable was assigned to a factor only if it did not have a loading of .40 or greater on any of the other factors. A summary of the factor solutions for the student, industrial, and military samples appears in Table 2.[4]

Student Sample. Using the eigenvalues of the unaltered correlation matrix that were greater than one produced a five factor solution for the student sample. These five factors account for 65.4% of the variance in the sample data.

Insert Table 2 about here

There are notable similarities among the three factor solutions for the student sample. Specifically, for each of the three solutions all three feedback items load on the first factor and all three task significance items load on the second factor. Although factors 3, 4, and 5 do not always have loadings of .40 or greater for all three of the JDS questionnaire items comprising a given *a priori* dimension, the pattern of loadings suggests that these factors are best defined as the dimensions of autonomy and task identity, respectively. Table 3 reveals not only low intercorrelations among the *a priori* JDS dimension scores (median off-diagonal correlation of .17), but

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Insert Table 3 about here

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also high correlations between each *a priori* dimension and the factor that most closely identifies that dimension for each of the three factor models.[5]

Industrial Sample. Based on the eigenvalues of the unaltered correlation matrix, a five-factor solution was produced for the industrial sample. These factors account for 62.2% of the variance in the sample data. A summary of the three different factor model solutions may be found in Table 2.

As in the student sample, similarities exist among the three different factor model solutions. The first factor in each of the three factor solutions is composed of three autonomy items; all three feedback items load on the second factor; and all three identity items load on the third factor. Again, although factors 4 and 5 in the principal factor and maximum likelihood factor solutions do not always contain loadings of .40 or greater for all of the items comprising a given *a priori* dimension, the loadings do suggest that these factors are best defined as the dimensions of variety and task significance, respectively.

Table 4 reveals that the *a priori* dimensions correlate highly

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Insert Table 4 about here

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with the factor scores for the factor which most closely identifies

that dimension, as was the case with the student sample. Again, the low off-diagonal correlations (median r = .22) suggests that the five a priori dimensions are capturing distinct aspects of the work setting.

Military Sample. The military sample factor model produced a four factor solution based on the eignevalues of the unaltered correlation matrix. The four factors explained 52.0% of the variance; the factor solutions are reported in Table 2.

There are similarities among the three factor solutions, although the factor loadings do not suggest as clearly defined dimensions as either the student or industrial sample. An inspection of Table 2 reveals that Factor 1 is composed of both autonomy and variety items in all solutions. Factor 4 (consisting of two identity items) remains relatively stable across factor models. The feedback and significance items load on the same factor in each factor model.

The multiple-component aspect of the factors is reinforced by Table 5, which presents the correlations of the a priori dimensions

Insert Table 5 about here

and the factor scores for the different factor models. As can be seen, the correlations between the a priori dimensions and the

factors indicate that the *a priori* variety and feedback dimensions correlate moderately with the first three factors of each factor model. Autonomy correlates strongly (median r = .83) with Factor 1 of each factor model, while task significance correlates most strongly with Factors 2 and 3 of each model. The *a priori* dimension task identity is clearly related to Factor 4 of each of the three models (median r = .92).

Summary. The only JDS dimension with all three *a priori* items loading on the same factor in *all three* samples is task identity. The other four dimensions (autonomy feedback, significance, and variety), however, are clearly identified in both the student and industrial samples. In the military sample, the autonomy and variety items load on one factor, while the significance and feedback items consistently load on a second factor. In all of the samples, high correlations are obtained between each *a priori* dimension and the factor scores for the factor that most clearly resembles that dimension (or dimensions in the military sample). Thus, the *a priori* distinctions among job design constructs are supported by the student and industrial sample results. The *a priori* distinctions, however, are not as apparent with the military sample results.

Regression Analyses

Student Sample. The multiple regression results for the student sample appear in Table 6. As the table indicates, the dimensions as a group are equally good predictors of general job

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Insert Table 6 about here

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satisfaction, regardless of whether they are defined as *a priori* or factor dimensions. As the standardized beta weights indicate, the relative impact of a given dimension on satisfaction varies according to the factor model used to define that dimension. For example, the maximum likelihood solution feedback dimension has a beta weight of .13 and only the fourth greatest impact on satisfaction; however, the principal component solution feedback dimension has a beta weight of .36 and the largest independent influence on satisfaction. On the other hand, variety is consistently and significantly related to satisfaction in each of the four regressions.

Industrial Sample. Table 7 presents the results of the

Insert Table 7 about here

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multiple regression analyses of the *a priori* and factor dimensions with the short form of the JDS general satisfaction measure. Again, the dimensions are equally good predictors, regardless of whether defined as *a priori* or factor dimensions. Autonomy and

variety are consistently related to job satisfaction. In all but the regression model using a priori dimensions the feedback dimension is significantly related to satisfaction. This finding is most likely the result of an orthogonal factor model that removes multicollinearity among the job dimensions used in subsequent regression equations.

Military Sample. Multiple regression analyses were performed for the military sample in the same manner as the student and industrial samples; Table 8 presents the results of these analyses.

Insert Table 8 about here

The average r^2 for the four regression equations is .31, indicating again that the dimensions as a group are equally good predictors of general satisfaction, regardless of definition--either as a priori dimensions or factor scores.

Because of the difficulty in defining the factors in the military sample, it is also difficult to assess the relative impact of the dimensions across the different regression models. It should be noted, however, that the task identity factor consistently has the least impact on satisfaction. Furthermore, variety and autonomy (which are both represented by the first factor in all factor models) consistently have the greatest impact on satisfaction.

Summary. In all the samples, the *a priori* and factor dimensions are equally good predictors of general job satisfaction. Generalizing across the three samples, the variety and autonomy dimensions are the strongest determinants of general job satisfaction, while task identity consistently is consistently the weakest determinant.

Discussion

The findings of the present study provide partial support for the generalization of job design constructs over different research settings. The failure to recover the *a priori* JDS dimensions from the factor models for the military sample may be due to situational constaints (Herman, 1973). In theory all of the military respondents were exposed to the same task (basic training) thus, we would expect the ratio of between-job variation to within-job variation on the JDS to be smaller than the student or industrial samples where between-job variation was ensured through experimental manipulations and a between-job sampling plan, respectively. The variation in responses for the military sample could reflect both individual differences in perceptual styles and/or true "between-job" differences. The degree to which job design constructs are empirically distinct, then, should depend a great deal on whether true between-job differences are extant for the sample under study. An interesting

issue for further research is to what extent between-job versus between-person (individual difference variables) variation is being captured by perceptual measures of job design constructs.

In response to the question of whether to subject job design measures to some form of data reduction, the answer would have to depend on the purpose of the researcher. If one is interested in predicting or forecasting, say general job satisfaction, then the JDS dimensions could be condensed for parsimony. Our results, however, suggest that the Hackman and Oldham (Note 1) JDS measures are adequate as defined. If, alternatively, we hypothesize that the job design constructs--behavior/affect relationship will vary structurally as we move across different organizational levels or different cultures or different employees (indexed on individual difference measures) then we would want to maintain the distinctions among the job design constructs in order to assess the issue of heterogeneous job design-construct-behavior/affect relationships. The student and industrial sample factor model results suggest that the <u>a priori</u> JDS distinctions are appropriate.

Despite the limitations cited above for the military sample, the regression results for <u>all three</u> samples suggest that the job design constructs of autonomy and skill variety are consistently related to general job satisfaction. This is an important finding for researchers and practitioners alike; the extent to which

job redesign efforts effectively improve general job satisfaction will depend on whether job redesign efforts have altered the employee's perception of the autonomy and skill variety components associated with the job. Carefully designed laboratory research that experimentally manipulates job scope dimensions while controlling for sample characteristics and job mix could provide important corroboration of field study results linking the task dimensions of skill variety and autonomy to affective and behavioral outcomes.

Although the JDS is the most widely used instrument for the measurement of job design perceptions, the internal consistency and test-retest reliabilities suggest that the JDS could be improved. Comparisons should be made between different measures of job design constructs and between the relationships of each different measure to satisfaction. Some research has already begun in this direction (Pierce & Dunham, 1978). The low test-retest reliabilities may also suggest that job scope perceptions and job satisfaction are changing over time. Within subjects designs would be useful to explore whether these changes in perceptions and affect are systematically related.

Reference Notes

1. Hackman, J. R. & Oldham, G. R. The job diagnostic survey: An instrument for the diagnosis of jobs and the evaluation of job redesign projects (Tech. Rep. No. 4). New Haven, Conn.: Yale University, Department of Administrative Sciences, 1974.

References

Anderson, N. H., & Shanteau, J. Weak inference with linear models. Psychological Bulletin, 1977, 84, 1155-1170.

Brief, A. P., & Aldag, R. J. Employee reactions to job characteristics: A constructive replication. Journal of Applied Psychology, 1975, 60, 182-186.

Cronbach, L. J. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297-334.

Dunham, R. B. The measurement and dimensionality of job characteristics. Journal of Applied Psychology, 1977, 61, 404-409.

Dunham, R. B. Relationships of perceived job design characteristics to job ability requirements and job value. Journal of Applied Psychology, 1977, 62, 760-763.

Dunham, R. B., Aldag, R. J. & Brief, A. P. Dimensionality of task design as measured by the job diagnostic survey. Academy of Management Journal, 1977, 20, 209-223.

Dziuban, C. D., & Shirkey, E. C. When is a correlation matrix appropriate for factor analysis? Some decision rules. Psychological Bulletin, 1974, 81, 358-361.

Hackman, J. R., & Lawler, E. E. Employee reactions to job characteristics. Journal of Applied Psychology Monograph, 1971, 55, 259-286.

Hackman, J. R., & Oldham, G. R. Development of the job diagnostic survey. Journal of Applied Psychology, 1975, 60, 159-170.

Hackman, J. R., & Oldham, G. R. Motivation through the design of work: Test of a theory. Organizational Behavior and Human Performance, 1976, 16, 250-279.

Hackman, J. R., Oldham, G. R., Janson, R., Purdy, K. A new strategy for job enrichment. California Management Review, 1975, (Summer), 57-71.

Herman, J. B. Are situational contingencies limiting job attitude-job performance relationships? Organizational Behavior and Human Performance, 1973, 10, 208-224.

Lawler, E. E., Hackman, J. R., & Kaufman, S. Effects of job redesign: A field experiment. Journal of Applied Social Psychology, 1973, 3, 49-62.

Mobley, W. H., Hand, H. H., & Logan, J. E. A longitudinal study of enlisted personnel attrition in the U. S. Marine Corps: Preliminary recruit training results. In H. W. Sinaiko, (Ed.), First term enlisted attrition, Washington, D. C.: Smithsonian Institution, 1977.

Pierce, J. L., & Dunham, R. B. Task Design: A literature review. Academy of Management Review, 1976, 1, 83-97.

Pierce, J. L., & Dunham, R. B. The measurement of perceived job characteristics: The job diagnostic survey versus the job characteristics inventory. *Academy of Management Journal*, 1978, *21*, 123-128.

Porter, L. W., & Steers, R. M. Organization, work, and personal factors in employee turnover and absenteeism. *Psychological Bulletin*, 1973, *80*, 151-176.

Schneider, B. *Staffing organizations*. Santa Monica, Ca.: Goodyear Publishing, Inc., 1976.

Sims, H. P., & Szilagyi, A. D., & Keller, R. T. The measurement of job characteristics. *Academy of Management Journal*, 1976, *19*, 195-212.

Stone, E. F. The moderating effect of work-related values on the job scope--job satisfaction relationship. *Organizational Behavior and Human Performance*, 1976, *15*, 147-167.

Turner, A. N., & Lawrence, P. R. *Industrial jobs and the worker*. Boston, Mass.: Harvard University, Graduate School of Business Administration, 1965.

Vroom, V. *Work and Motivation*. New York: Wiley, 1964.

Youngblood, S. A. *Modeling absenteeism by scaling work and nonwork preferences*. Unpublished doctoral dissertation, Purdue University, 1978.

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[1]The authors recognize that other instruments have been developed and used to measure job design characteristics (see, for example, Pierce & Dunham, 1978; Sims, Szilagyi & Keller, 1976; Stone, 1976). The issues addressed in this study are equally valid for alternative measures of job design characteristics.

[2]Of course, the multicollinearity problem disappears when a factor analysis of the JDS dimensions yields only one factor or when the JDS dimensions are perfectly uncorrelated. In this latter case, it would be inappropriate to subject the data to any type of factor model (Dziuban & Shirkey, 1974). Available research, however, suggests that the dimensionality issue lies somewhere between these two extremes.

[3]The difference in scaling (5-point Likert scales used for

the military sample and 7-point scales used for the student and industrial samples) does not affect the factor model results since the survey items are standardized prior to factorization.

[4]Appendices A through C provide the rotated factor solutions for each of the three factor models across the three distinct samples.

[5]This conclusion still remains true after the intercorrelations are adjusted for attenuation due to unreliability of the JDS scales.

Table 1

Coefficient Alphas and Test-Retest Reliabilities for the *a priori*

JDS Dimensions and the General Job Satisfaction Measure

	Sample				
Scale	Student	Industrial		Military	
	α[a]	α	r[b]	α	r
Skill Variety	.61	.70	.78	.61	.25
Task Identify	.59	.65	.60	.59	.15
Task Significance	.72	.46	.48	.72	.25
Autonomy	.62	.73	.52	.62	.20
Feedback from Job	.76	.69	.63	.76	.22
Satisfaction	.67	.76	.22	.67	.22

[a] Cronbach (1951) coefficient alpha

[b] Test-retest reliability for the industrial and military sample only. The time between measures for the industrial sample was about six weeks and the sample size varied (due to missing value) from 37 for satisfaction to 48 for autonomy. The time between measures for the military sample was about forty-five weeks and the sample size varied from 418 for task identity to 428 for task significance.

Table 2

Factor Solutions After Varimax Rotation[a]

Sample	Factor	Eigenvalues[b]	Factor Model: Principal Component	Factor Model: Principal Factor	Factor Model: Maximum Likelihood
Student	1	3.47	3F	3F	3F
	2	2.25	3S	3S	3S
	3	1.79	3I	2A	2A
	4	1.21	3A,1F	3I	2I
	5	1.10	1V	3V	3V
Industrial	1	3.90	3A	3A	3A,1V
	2	1.61	3F	3F	3F
	3	1.50	3I	3I	3I
	4	1.27	2V,1S	1V	1V
	5	1.03	2S	1S	1S
Military	1	3.80	2A,1V	2A,2V	2A,2V
	2	1.67	1V,1A,1S,1F	1A,1S,1F	2S,2F
	3	1.24	2S,2F	2S,2F	1S,1A,1F
	4	1.09	3I	2I	2I

[a]In this and all remaining tables and appendices the following abbreviations are used for the five core dimensions of the JDS; autonomy (A), feedback from the job (F), task identity (I), task significance (S), and skill variety (V).

[b]These are the eignevalues of the unaltered correlation matrix and do not represent the variance accounted for by the factors in the final rotated solutions.

Table 3

Correlations of a priori Dimensions with

Factor-Model Dimensions - Student Sample

Factor-model Dimensions		a priori Dimensions V	I	S	A	F
a priori Dimensions	V	1.00				
	I	.29**	1.00			
	S	.13	.06	1.00		
	A	.13	.17	.36**	1.00	
	F	.42**	.18	.19	-.05	1.00
Principal Components	V	.78**	.05	.06	.11	.19
	I	.28**	.97**	.00	.06	.06
	S	-.04	.05	.95**	.28*	.14
	A	.13	.06	.16	.90**	-.16
	F	.40**	.09	.11	-.02	.92**
Principal Factors	V	.91**	.19	.08	.06	.35**
	I	.23*	.88**	-.04	.11	.08
	S	.05	.07	.93**	.28*	.14
	A	.11	.09	.21	.89**	-.14
	F	.29*	.10	.11	-.01	.90**
Maximum Likelihood Factors	V	.93**	.21	.10	.05	.40**
	I	.17	.78**	-.06	.12	.08
	S	.06	.08	.92**	.24*	.13
	A	.10	.08	.23*	.89**	-.14
	F	.21	.09	.09	.00	.84**

* $p < .05$

** $p < .01$

Table 4

Correlations of *a priori* Dimensions with

Factor-Model Dimensions - Industrial Sample

Factor-model Dimensions		*a priori* Dimensions V	I	S	A	F
a priori Dimensions	V	1.00				
	I	.16**	1.00			
	S	.22**	.15**	1.00		
	A	.49**	.35**	.18**	1.00	
	F	.27**	.21**	.24**	.33	1.00
Principal Components	V	.81**	.01	.29**	.19**	.11*
	I	.00	.96**	.11*	.27**	.10*
	S	.07	.08	.88**	.06	.06
	A	.49**	.18**	-.09*	.83**	.14**
	F	.08	.08	.19**	.21**	.97**
Principal Factors	V	.76**	.02	.09*	.10*	.07
	I	.03	.97**	.09*	.29**	.14**
	S	.18**	.11*	.83**	.09*	.16**
	A	.55**	.20**	.07	.89**	.18**
	F	.17**	.14**	.20**	.23**	.97**
Maximum Likelihood Factors	V	.68**	.01	.07	.07	.06
	I	.03	.95**	.08	.28**	.14**
	S	.17**	.13**	.83**	.09*	.17**
	A	.58**	.23**	.08*	.91**	.20**
	F	.17**	.14**	.19**	.22**	.97**

*p < .05

**p < .01

Table 5

Correlations of a priori Dimensions with

Factor-Model Dimensions - Military Sample

Factor-model Dimensions		V	I	S	A	F
a priori Dimensions	V	1.00				
	I	.28**	1.00			
	S	.35**	.28**	1.00		
	A	.35**	.32**	.19**	1.00	
	F	.41**	.36**	.45**	.31**	1.00
Principal Components	Factor 1[a]	.62**	.18**	-.03	.79**	.27**
	Factor 2	.47**	.12**	.41**	.24**	.41**
	Factor 3	.34**	.23**	.78**	-.05*	.58**
	Factor 4	-.09**	.91**	.08**	.27**	.25**
Principal Factors	Factor 1	.61**	.31**	.06*	.83**	.37**
	Factor 2	.44**	.21**	.58**	.27**	.54**
	Factor 3	.45**	.31**	.79**	.03	.63**
	Factor 4	.00	.92**	.11**	.24**	.25**
Maximum Likelihood Factors	Factor 1	.58**	.31**	.04	.84**	.37**
	Factor 2	.48**	.32**	.79**	.04	.64**
	Factor 3	.41**	.20**	.58**	.28**	.53**
	Factor 4	.02	.92**	.10**	.23**	.24**

Columns V, I, S, A, F are a priori Dimensions.

[a]Factors are numbered because the interpretation of the factor solutions for each of the three models is ambiguous.

*$p < .05$

**$p < .01$

Table 6

Multiple Regression of General Satisfaction as a Function of

a priori Dimensions and Factor-Model Dimensions - Student Sample

Independent Variable		b	Beta	t	r^2	F
a priori Dimensions	V	.405	.330	2.876		
	I	-.066	-.066	.624		
	S	.099	.096	.876		
	A	.173	.180	1.280		
	F	.212	.221	1.941		
					.28	5.66**
Principal Components Model	V	.420	.282	2.782		
	I	-.067	.045	.422		
	S	.193	.129	1.277		
	A	.290	.195	1.922		
	F	.528	.355	3.502		
					.26	5.10**
Principal Factors Model	V	.724	.387	3.769		
	I	-.024	-.001	.000		
	S	.204	.125	1.227		
	A	.310	.180	1.771		
	F	.316	.196	1.916		
					.26	5.03**
Maximum Likelihood Model	V	.797	.436	4.301		
	I	-.023	-.015	.152		
	S	.220	.137	1.356		
	A	.293	.171	1.690		
	F	.191	.128	1.265		
					.27	5.25**

n = 78

*p < .05

**p < .01

Table 7

Multiple Regression of General Satisfaction as a Function of

a priori Dimensions and Factor-Model Dimensions - Industrial Sample

Independent Variable		b	Beta	t	r^2	F
a priori Dimensions	V	.176	.193	3.574		
	I	-.041	-.042	.832		
	S	.017	.013	.270		
	A	.235	.256	4.497		
	F	.089	.081	1.606		
					.17	16.13**
Principal Components Model	V	.309	.212	4.584		
	I	.058	.040	.860		
	S	.035	.024	.522		
	A	.458	.314	6.792		
	F	.228	.156	3.380		
					.17	15.94**
Principal Factors Model	V	.200	.129	2.771		
	I	.010	.006	.122		
	S	.100	.057	1.232		
	A	.542	.332	7.091		
	F	.242	.137	2.918		
					.16	15.21**
Maximum Likelihood Model	V	.162	.111	2.377		
	I	.007	.004	.077		
	S	.091	.053	1.138		
	A	.557	.342	7.307		
	F	.240	.135	2.888		
					.16	15.16**

n = 395

*p < .05

**p < .01

Table 8

Multiple Regression of General Satisfaction as a Function of

a priori Dimensions and Factor-Model Dimensions - Military Sample

Independent Variable		b	Beta	*t*	r^2	*F*
a priori Dimensions	V	.319	.310	10.230		
	I	.011	.011	.365		
	S	.083	.078	2.615		
	A	.246	.226	7.803		
	F	.136	.124	3.894		
					.31	90.99**
Principal Components Model	Factor 1 (A,V)[a]	.395	.431	16.702		
	Factor 2 (V,A,S,F)	.209	.227	8.810		
	Factor 3 (S,F)	.238	.259	10.013		
	Factor 4 (I)	.068	.074	2.881		
					.31	116.30**
Principal Factors Model	Factor 1 (A,V)	.472	.418	15.688		
	Factor 2 (A,S,F)	.266	.217	8.022		
	Factor 3 (S,F)	.216	.180	6.600		
	Factor 4 (I)	.002	.001	.044		
					.31	114.11**
Maximum Likelihood Model	Factor 1 (A,V)	.465	.411	15.389		
	Factor 2 (S,F)	.232	.194	7.117		
	Factor 3 (S,A,F)	.257	.210	7.769		
	Factor 4 (I)	.005	.004	.141		
					.30	113.33**

[a]Symbols appearing in parentheses are the JDS items that loaded on a given factor and provide a basis to compare the different regression results.

$n = 1040$

$^{*}p < .05$

$^{**}p < .01$

Appendix A

Varimax Rotated Factor Matrices - Student Sample

Factor Method		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Principal Components	V1	.461	-.058	.211	.327	.549
	V2	.288	-.082	.428	.217	.450
	V3	.181	.046	.022	-.208	.738
	I1	.329	.313	.727	-.030	.105
	I2	-.177	.011	.752	.058	.300
	I3	.112	-.178	.685	.107	-.341
	S1	.192	.846	.036	.123	.004
	S2	.111	.721	.141	.142	-.166
	S3	-.028	.725	-1.55	.130	.257
	A1	-.008	.112	.055	.844	.016
	A2	-.129	.299	-.022	.433	.351
	A3	.075	.221	.099	.753	-.101
	F1	.838	.102	.156	-.019	.114
	F2	.873	.095	.008	.072	.049
	F3	.564	.148	-.024	-.423	.292
Principal Factors	V1	.303	.017	.255	.193	.602
	V2	.162	-.002	.167	.323	.481
	V3	.139	.073	-.161	-.026	.557
	I1	.262	.321	-.051	.773	.198
	I2	-.072	-.013	.100	.514	.222
	I3	.061	-.140	.100	.496	-.100
	S1	.162	.873	.122	.020	.021
	S2	.106	.534	.168	.112	-.070
	S3	-.006	.618	.161	-.186	.183
	A1	-.038	.129	.785	.086	.032
	A2	-.036	.230	.320	-.004	.152
	A3	.054	.225	.620	.141	-.073
	F1	.715	.116	-.030	.184	.245
	F2	.900	.083	.083	.027	.120
	F3	.455	.117	-.331	-.040	.319
Maximum Likelihood Factors	V1	.221	.035	.234	.175	.662
	V2	.118	.016	.178	.237	.545
	V3	.133	.070	-.170	-.013	.510
	I1	.217	.353	-.084	.879	.221
	I2	-.024	-.044	.101	.508	.177
	I3	.040	-.102	.115	.356	-.026
	S1	.152	.892	.135	-.012	.050
	S2	.074	.525	.160	.124	-.030
	S3	-.009	.625	.181	-.222	.157
	A1	-.055	.112	.760	.123	.050
	A2	-.013	.174	.331	.002	.135
	A3	.063	.224	.639	.143	-.078
	F1	.650	.121	-.040	.226	.309
	F2	.981	.075	.103	.028	.141
	F3	.445	.102	-.335	-.046	.344

Appendix B

Varimax Rotated Factor Matrices - Industrial Sample

Factor Method		Varimax Rotated Factor Matrix				
Principal Components		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
	V1	.615	.093	.025	.568	.076
	V2	.384	.046	-.039	.489	.156
	V3	.182	.042	.145	.855	-.047
	I1	.376	.084	.585	-.015	.284
	I2	.034	.015	.816	.059	-.093
	I3	.044	.103	.780	-.025	.041
	S1	.083	.075	.114	.080	.792
	S2	.019	.047	-.041	.038	.740
	S3	-.263	.256	.148	.466	.330
	A1	.815	.083	.150	.194	.006
	A2	.415	.240	.387	.252	.146
	A3	.803	.169	.111	.015	.000
	F1	.180	.769	.060	.040	.191
	F2	.228	.739	.030	-.039	.110
	F3	-.061	.779	.139	.234	-.121
Principal Factors	V1	.612	.129	.036	.444	.123
	V2	.346	.100	.011	.277	.168
	V3	.206	.096	.081	.917	.065
	I1	.320	.100	.481	.013	.241
	I2	.037	.046	.731	.069	-.038
	I3	.093	.122	.595	-.045	.055
	S1	.102	.048	.089	-.010	.803
	S2	.034	.077	.008	.041	.380
	S3	.003	.214	.061	.136	.262
	A1	.811	.074	.144	.117	.020
	A2	.413	.231	.312	.138	.172
	A3	.721	.150	.126	-.014	-.010
	F1	.176	.666	.074	.025	.212
	F2	.203	.565	.073	-.009	.116
	F3	.025	.668	.121	.136	-.002
Maximum Likelihood Factors	V1	.623	.135	.030	.394	.102
	V2	.359	.100	.011	.242	.174
	V3	.239	.093	.009	.964	.069
	I1	.338	.101	.472	.006	.243
	I2	.032	.046	.746	.080	-.027
	I3	.101	.123	.586	-.061	.038
	S1	.109	.037	.087	-.018	.819
	S2	.032	.080	.006	.030	.370
	S3	.015	.207	.045	.133	.268
	A1	.814	.072	.128	.095	.025
	A2	.438	.220	.307	.126	.172
	A3	.717	.148	.127	-.045	-.017
	F1	.173	.672	.071	.033	.219
	F2	.200	.574	.077	-.024	.105
	F3	.040	.651	.119	.124	.015

Appendix C

Varimax Rotated Factor Matrices - Military Sample

Factor Method		Factor 1	Factor 2	Factor 3	Factor 4
Principal Components	V1	.603	.198	.279	.000
	V2	.583	.155	.405	-.125
	V3	.144	.665	.050	-.086
	I1	.227	-.006	.333	.548
	I2	-.097	.279	-.092	.780
	I3	.284	-.036	.267	.634
	S1	.139	.164	.668	.114
	S2	.102	.083	.752	.007
	S3	-.125	.617	.344	.053
	A1	.711	-.007	-.005	.155
	A2	.281	.611	-.085	.243
	A3	.699	-.085	-.028	.174
	F1	.376	.140	.525	.209
	F2	.324	.123	.529	.219
	F3	-.098	.621	.238	.134
Principal Factors	V1	.499	.181	.260	.025
	V2	.476	.137	.367	-.052
	V3	.081	.396	.116	.030
	I1	.265	.069	.297	.358
	I2	-.016	.245	-.036	.632
	I3	.313	.014	.274	.468
	S1	.170	.213	.540	.100
	S2	-.013	.172	.545	.021
	S3	-.063	.546	.265	.052
	A1	.602	.019	.032	.099
	A2	.248	.467	-.009	.172
	A3	.579	-.052	.027	.112
	F1	.373	.191	.445	.150
	F2	.329	.182	.434	.153
	F3	-.030	.506	.193	.106
Maximum Likelihood Factors	V1	.489	.274	.171	.031
	V2	.458	.387	.115	-.035
	V3	.074	.126	.382	.041
	I1	.258	.301	.070	.362
	I2	-.016	-.044	.249	.642
	I3	.306	.281	.012	.469
	S1	.159	.535	.219	.106
	S2	-.019	.536	.184	.009
	S3	-.064	.259	.553	.047
	A1	.604	.037	.028	.094
	A2	.257	-.013	.477	.160
	A3	.584	.037	-.050	.105
	F1	.366	.451	.193	.145
	F2	.323	.444	.183	.149
	F3	-.029	.194	.506	.098

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